UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/903,028	07/11/2001	Nuggehally S. Jayant	07816.105003	9832

			EXAMINER
20786	7590	05/19/2004	ROSARIO-VASQUEZ, DENNIS

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ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 05/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/903,028	JAYANT ET AL.
	Examiner	Art Unit
	Dennis Rosario-Vasquez	2621

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>11 July 2001</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-20</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-20</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>11 July 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>4</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Objections

1.   The following quotations of 37 CFR § 1.75(a) is the basis of objection:

(a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

2.   Claim 4 is objected to under 37 CFR § 1.75(a) as failing to particularly point out

and distinctly claim the subject matter which the applicant regards as his invention or

discovery.

Claim 4 is referring to itself as a method of claim 4. Claim 4 will be interpreted in

this office action as to referring to a method of claim 3.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4.   Claims 1,2,3,4,5,6,7,8,11 are rejected under 35 U.S.C. 102(b) as being

anticipated by Bolle et al. (US Patent 5,883,971 A).

Regarding claim 1, Bolle et al. discloses a method (Figs. 8, 8A and 8B) for

processing an image (Fig. 10 is an image of a fingerprint.), comprising the steps of:

.   a)   comparing (Fig. 8A, num. 823 is a pixel of interest intensity comparing

step with the pixel of interest depicted as "(i,j)" and shown in figure 9.) a first image

intensity (Fig. 10, num. 1030 and the enclosing area of 1030 is the foreground or first

image intensity.) associated with a subject image portion (Using figure 10, foreground

1030 of a fingerprint.) with a second image intensity (Fig 10, num. 1050 is the

background or second intensity.) associated with an adjacent image (Fig. 10, num. 1050

is adjacent to numeral 1030 which encloses an area that includes numerals 1010,

1015,1020, 1040, 1045 and 1060.);

        b)   determining an image intensity difference (Fig. 8A,num. 824 is a sum of

differences between each direction of intensity pixels of figure 9.) between the first

image intensity and the second image intensity.

        c)   classifying (Fig. 8B, num. 884 classifies all intensity values within each

block or square of figure 10 as either "SMUDGED BLOCK" or "NON-SMUDGED

BLOCK".) the subject image portion (The "foreground".) as a candidate edge portion (In

a previous step 882 of figure 8B the ridges of the fingerprint or edges are computed

within the foreground at col. 10, line 1-6 and further elaborated at col. 3, lines 46-57.) in

response to a determination (Fig. 8B,num. 882 is a previous determination step.) that

the first image intensity is less than the second image intensity (Using figure 8B, Bolle et

al. states, "For each block, step 882 [of figure 8, num. 880:"SMUDINESS ANALYSIS"]

next computes the mean intensity (μ)of pixels whose intensities are smaller than the

mean intensity of all pixels within the block. (The pixels whose intensities are smaller

than the mean intensity of all pixels in the block are considered to be pixels on a ridge,

i.e., ridge pixels (col. 10, lines 1-6)."Note, that the block as depicted in figure 9 has a

plurality of pixels that correspond to different intensities that are higher or lower in

value.) and a determination (Fig. 8A,num. 824.) that the image intensity difference

(figure 8A, num. 824, label: "$\sum$(differences)") is greater (figure 8A, num. 824, label: ">")

than a predetermined threshold image intensity difference (figure 8A, num. 824, label:

""BACKGROUND THRESHOLD" is a predetermined threshold intensity difference of

120 at col. 7, lines 20-22.).;

     d)   determining (fig. 8B, num. 887 determines whether a smudged fingerprint

or a non-smudged fingerprint is present.) whether the candidate edge portion is a true

edge portion (Thus, the smudged fingerprint represents a false fingerprint which needs

to be processed again to produce a true non-smudged fingerprint.) In addition,

additional previous determining steps are performed for determining a foreground ; and

     e)   associating the subject image portion (Using figure 10, foreground 1030

of a fingerprint.) with a third image intensity (Figure 10, num. 1010 is a plurality of blocks

with orientation determined (Numeral 1040 is a line with orientation within a block.)

using the window array of figure 9 that uses intensity to determine the direction as

described in figure 8A.), wherein the third image intensity is less than the first image

intensity (This element was addressed above for finding ridges or edges.).

Regarding claim 2, Bolle et al. discloses the method of claim 1, wherein the step of determining whether the candidate edge portion is a true edge portion, comprises the step of determining whether the candidate edge portion (Fig. 10, num. 1030 is the foreground area or candidate edge portion that comprises additional area 1010 within the area of 1030. Each area of 1010 has a direction that corresponds to a ridge of a finger print or an edge as depicted as numeral 1040 of figure 10.) is adjacent to at least one second candidate edge portion (Thus the whole area 1010 contains ridges or edges of a fingerprint contained within each block or square.)

Claim 3 has been addressed in claim 2.

Claim 4 has been addressed in claim 2.

Regarding claim 5, Bolle et al. discloses the method of claim 1, wherein the image is a digitized image (Bolle et al. uses a scanner fig.7, num. 765 converts analog signals to digital).

Regarding claim 6, Bolle et al. discloses the method of claim 5, wherein the image subject portion is a pixel (Each square or block of figure 10 contains an array of pixels as shown in figure 9 which determines the orientation of each pixel in the block , fig. 8A, num. 822, for the entire image.).

Regarding claim 7, Bolle et al. discloses the method of claim 5, wherein the adjacent image portion is a pixel (Claim 7 has been addressed in claim 6).

Regarding claim 8, Bolle et al. discloses the method of claim 5, wherein the

image is a frame (Fig. 7, num. 750 is a frame grabber that capture a frame) of a video

stream (Fig. 7, num. 760 is a camera which provides frames to the framegrabber 750.

Note that the framegrabber captures multiple frames or captures video.).

Regarding claim 11, Bolle et al. discloses the method of claim 1, wherein the

image is an image-type delected from the group consisting of:

Real-time streaming video (Addressed in claim 8).

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Bolle et al. (US Patent 5,883,971 A) in view of Sojourner (US Patent 6,473,092 B1).

Regarding claim 10, Bolle et al. does not teach intensity measures in

luminance and chrominance, but Bolle et al. does suggest lighting and illumination

during image acquisition at col. 2, lines 35 and 53.

However, Sojourner, in the field of endeavor of illumination of displays, does teach the image intensity that is measured in luminance (Sojourner teaches that a pixel is illuminated by a light source) and chrominance (The illuminated pixel produces a luminance value and chrominance or color value (col. 3, lines 26-31) that can be combined with other chrominance values to produce a single intensity (col. 3, lines 35-40).).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify image acquisition teaching that uses intensity of Bolle et al. using the teaching of Sojourner's intensity teaching, because Sojourner's intensity teaching "renders images in a way optimized for perception by the human visual system [as in the identification of finger prints as taught by Bolle et al.]. This allows improved image color quality and a reduction in device complexity (Sojourner, col. 3, lines 40-43)."

Claim 9 has been addressed in claim 10.

7.   Claims 12,13,14,15,16,17,18,19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bolle et al. (US Patent 5,883,971 A) in view of Cox, Jr. et al (US Patent 5,237,316 A).

Regarding claim 12, Bolle et al. teaches a system (fig. 7) for enhancing (Bolle et al.'s pre-processing system rejects images that have smudges for further processing at col. 3, lines 4-7.) a digitized image (fig. 7, num. 765), comprising:

a)   a post-processing unit (fig. 8, num. 850:"POSTPROCESSING") operative

to filter (A 3X3 matrix of blocks is used to assign a direction or no direction based on

surrounding neighboring blocks of the central block at col. 8, lines 27-40.) the digitized

image to process an image flaw ("noise" at Bolle et al., col. 8, line 17-19);

b)   an edge enhancer (Fig. 8 is the program of figure 7, num. 800 that

enhances edges.) operative to detect an edge (fig. 8, num. 830 detects the orientation

or edge of pixels using figure 9.) in the digitized image and to enhance the edge (Fig. 8,

num. 850 enhances edges and was addressed above.) in the digitized image.

Regarding claim 18, Bolle et al. discloses a method for detecting and enhancing

an edge in a digitized image, comprising the steps of:

a)   determining a first image intensity associated with a first pixel in the

digitized image (Addressed in claim 1.);

b)   determining a second image intensity associated with a second pixel in

the digitized image (Addressed in claim 1);

c)   determining a third image intensity associated with a third pixel in the

digitized image (Addressed in claim 1);

d)   classifying the first pixel as a first candidate edge pixel in response to a

determination that the first image intensity is less than the second image intensity (This

portion was addressed in claim 1.) and is less than the third image intensity (This

portion was addressed in claim 1c under "ridge pixels".);

e)   determining whether the first pixel is adjacent to a second candidate edge

pixel (Addressed in claim 1.);

f)   determining whether the second pixel is adjacent to a third candidate edge

pixel (Addressed in claim 2.);

g)   classifying the first pixel as a true edge pixel in response to a

determination that the first pixel is adjacent to the second candidate edge pixel(This

portion was addressed in claim 1 and 2) and the second candidate edge pixel is

adjacent to the third candidate edge pixel (Addressed in claim 3);

h)   associating a fourth image intensity with the first pixel, the fourth image

intensity being lower than the first image intensity (Addressed in claim 1).

Claim 19 was addressed in claim 1c.

Bolle et al. does not suggest a decoder, but does suggest transmitting/receiving

data (fig. 7, num. 730) over a network as shown in figure 7, num. 786.

However, Cox, Jr. et al., in the field of endeavor of image compression with

intensity, teaches a decoder of claim 12:

A decoder (Cox, Jr. et al., fig. 1, num. 50) operative to receive an encoded (fig. 1,

num. 30) digitized image (fig. 1, num. 24) and to expand (fig. 1, num 22:

"RECONSTRUCTION") the encoded digitized image to generate a decoded digitized

image (Fig. 1, num. 26:"IMAGE DISPLAY").

It would have been obvious at the time the invention was made to one of ordinary

skill in the art to modify Bolle et al.'s transmission of data over a network with Cox, Jr et

al.'s encoder 30 and decoder 50 and figure 1, label: "STORAGE AND TRANSMISSION"

teaching, because Cox, Jr et al.'s encoder 30, decoder 50 and figure 1, label:

"STORAGE AND TRANSMISSION" teaching provides "images constructed of pixels

with 12-bit intensity values may be compressed into 8-bit bytes of differential data for

storage or transmission and then decoded at rates sufficient to support flicker-free

display of an image having a frame size of 1024X1024 pixels (Cox, Jr. et al., col. 3, lines

40-45)." Thus, Cox, Jr et al. compression saves time and space for transmission and

storage space, respectively.

Claim 13 has different claim language than claim 1, but both are describing the

same limitation; therefore, claim 13 has been addressed in claim 1.

Claim 14 has been addressed in claim 4.

Claim 15 has been addressed in claim 1.

Regarding claim 16 Bolle et al. teaches the system of claim 12, wherein the

postprocessor removes the image flaw from the decoded digitized image, in response to

a determination that an image intensity of a pixel (The direction of a block that contains

pixels as depicted in figure 9 using intensity is determined) associated with the image

flaw or "noise" does not differ (or is "consistent") from at least one surrounding

pixel("neighbors" that are blocks of pixels) (The flaw or noise is removed from blocks

that are inconsistent with their neighbors (col. 8, lines 21,22); thus consistent or blocks

that do not differ will not be associated with noise.) by more than a threshold value (The

threshold value is based on the directions of the neighboring blocks.).

Regarding claim 17, Bolle et al. teaches the system of claim 12, wherein the post-processor adjusts the image flaw in the decoded digitized image, by modifying an image intensity of a pixel (Bolle et al. modifies a central block of interest as depicted in figure 9.) associated with the image flaw to correspond to a median image intensity (Bolle et al. uses the central block of interest which is located in the middle of the array of figure 9 that uses intensity to determine direction of the central block of interest.) value of at least one surrounding pixel (The central block of interest has neighboring blocks as shown in figure 9 (col. 8, lines 37-40).).

8.   Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bolle et al. (US Patent 5,883,971 A) in view of Cox, Jr. et al (US Patent 5,237,316 A) further in view of Sojourner (US Patent 6,473,092 B1).

Regarding claim 20, Bolle et al. teaches the method of claim 18, further comprising the steps of:

a)   determining a background (Fig. 8, num. 820 which is further detailed in fig. 8A, num. 826:"BACKGROUND PIXEL") associated with the first pixel;

b)   determining a quality level (figure 8, num. 870:"QUALITY VALUE COMPUTATION") of the digitized image; and

c)   selecting the fourth image intensity(Figure 8, num. 880:"SMUDGEINESS ANALYSIS" uses) based on the background and quality level.

However, Bolle et al. does not teach determining a color, but Bolle et al. does suggest lighting and illumination during image acquisition at col. 2, lines 35 and 53.

However, Sojourner, in the field of endeavor of illumination of displays, does

teach the image intensity that is measured in luminance (Sojourner teaches that a pixel

is illuminated by a light source) and chrominance (The illuminated pixel produces a

luminance value and chrominance or color value (col. 3, lines 26-31) that can be

combined with other chrominance values to produce a single intensity (col. 3, lines 35-

40).).

It would have been obvious at the time the invention was made to one of ordinary

skill in the art to modify image acquisition teaching that uses intensity of Bolle et al.

using the teaching of Sojourner's intensity teaching, because Sojourner's intensity

teaching "renders images in a way optimized for perception by the human visual system

[as in the identification of finger prints as taught by Bolle et al.]. This allows improved

image color quality and a reduction in device complexity (Sojourner, col. 3, lines 40-

43)."

Conclusion

9.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

Sathe et al. (US Patent 5,909,249 A) is pertinent as teaching a method of color

conversion at figure 2 and 7.

Davis, Jr et al. (US Patent 4,742,556 A) is pertinent as teaching a method of

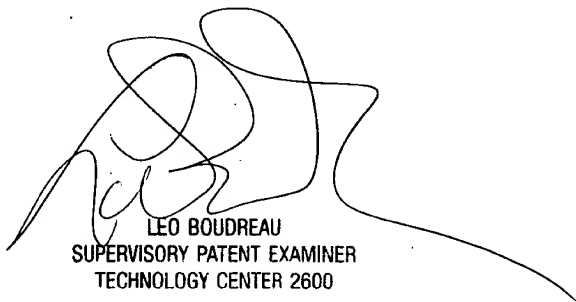capturing video using a frame grabber as depicted in fig. 1, num. 16 and 18.

10.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Dennis Rosario-Vasquez whose telephone number is

703-305-5431. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Leo Boudreau can be reached on 703-305-4706. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

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